| | Application No. | Applicant(s) |
|---|---|---|
| ***Notice of Allowability*** | 10/038,849 | RAMESH, BHASHYAM |
| | Examiner | Art Unit | |
| | Susan F. Rayyan | 2167 | |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to *3/8/05*.

2. ☒ The allowed claim(s) is/are *1-21*.

3. ☒ The drawings filed on *31 December 2001* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All    b) ☐ Some*    c) ☐ None  of the:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached

      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

    **Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date *3/8/05*

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☐ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____.

## Reasons For Allowance

1.     Request for Continued Examination has been received and entered on March 8,

2005.

2.     Information Disclosure Statement filed on March 8, 2005 has been considered.

3.     The following is a statement of reasons for the indication of allowable subject

matter:

The present invention is directed to performing an outer join of at least a first table

T1 and a second table T2, where the join has join conditions, each of the tables has an

associated Star Map, S1 and S2, respectively, and each Star Map includes bitmap

entries having locations indexed by the hash of one or more values associated with one

or more join key columns of its associated table, where a bitmap entry in a Star Map, if

set, indicates the presence of a row in its associated table that has entries in the one or

more join key columns that together hash to the location of the bitmap entry, the method

including

a) performing one or more Boolean operations using the bitmap entries of the Star

Maps S1 and S2 to produce set bitmap entries in a Star Map SJ where there is a

corresponding set bitmap entry in S1 and a corresponding set bitmap entry in S2; b)

selecting a row from table T1 and hashing the combined entries in the one or more join

key columns of the selected T1 row to identify a bitmap entry in SJ;

c) if the identified bitmap entry in SJ is not set, projecting the selected T1 row with a

NULL corresponding to data from table T2; and d) if the identified bitmap entry in SJ is

set, performing the following: d1) if no row in T2 satisfies the join conditions and has

entries in its one or more join key columns that together hash to the location of the

identified set bitmap entry in SJ, projecting the selected T1 row and a NIJLL

corresponding to data from table T2; and d2) otherwise, for

each row from 1,2 that satisfies the join condition and has entries in its one or more join

key columns that together hash to the location of the identified set bitmap entry in SJ,

projecting the selected T1 row with data from the row from T2; e) repeating b)-d) for all

rows in T1.

The closet prior art of record Bontempo et al. ("Accelerating Indexed Searching",

Miller Fredman Inc., 1997) teaches performing one or more Boolean operations using

the bitmap entries of the Star Maps S1 and S2 to produce set bitmap entries in a Star

Map SJ where there is a corresponding set bitmap entry in S1 and a corresponding set

bitmap entry in S2 and selecting a row from table T1 and hashing the combined entries

in the one or more join key columns of the selected T1 row to identify a bitmap entry in

SJ (see p. 4, Bitmap Indexing Revisited through p. 8).

However Bontempo et al. fails to anticipated or render obvious the recited features if the

identified bitmap entry in SJ is not set, projecting the selected T1 row with a NULL

corresponding to data from table T2, if the identified bitmap entry in SJ is set,

performing the following: if no row in T2 satisfies the join conditions and has entries in

its one or more join key columns that together hash to the location of the identified set

bitmap entry in SJ, projecting the selected T1 row and a NULL corresponding to data

from table T2 and otherwise, for each row from T2 that satisfies the join condition and

has entries in its one or more join key columns that together hash to the location of the

identified set bitmap entry in SJ, projecting the selected T1 row with data from the row

from T2 and repeating b)-d) for all rows in T1 as in independent claims 1,8, and 15.

These features, together with the other limitations of the independent claims are novel

and non-obvious over the prior art of record. The dependent claims 1-7,9-14,16-21

being definite, enabled by the specification, and further limiting to the independent

claim, are also allowable.


### *Conclusion*

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Susan Rayyan whose telephone number is (571) 272-

4117. The examiner can normally be reached M-F: 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, John Breene can be reached on (571) 272-4107 The fax phone numbers for

the organization where this application or proceeding is assigned are (703) 872-9306 for

Official communications, (703) 746-7238 for After Final communications and (703) 746-

7240 for Status inquires and draft communications.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is (571) 272-

2100.

Susan Rayyan

April 24, 2005

Primary Examiner